

and fourteen other maps. There are also eighty-six text illustrations, mostly of towns and of striking physical features. By the courtesy of the publishers, we are enabled to give one of the illustrations.

BRITISH FORESTRY.

THE recommendations in the report which has just been issued by the committee appointed by the President of the Board of Agriculture "to inquire into and report upon British forestry" follow very much the trend of the opinions that have in recent years been expressed in *NATURE* and elsewhere. As was expected from the terms of the reference to the committee—"to consider whether any measures might with advantage be taken, either by the provision of further educational facilities or otherwise," to improve and encourage the "position and prospects of forestry"—the report deals chiefly with the root-matter of the forestry question—education. To such an extent is this the case that other elements of the forestry problem in Britain, such as the incidence of rates, the taxes upon timber transport, inequality in the levying of estate duty and the game question, are treated as minor considerations.

The report recognises the different classes requiring education in the country—landlords, land-agents and wood-foresters. In the forefront of the recommendations, the committee places the acquisition by the State of "two areas for practical demonstration," "one in England and the other in Scotland, of not less than 2000 acres, if possible, nor over 10,000 acres in each case," to furnish an object-lesson and to serve as areas of instruction for working foresters. They also recommend that forestry should be a subject of instruction at Oxford and Cambridge as it is at Edinburgh, and that example-plots of 100-200 acres in extent should be formed in the vicinity of these universities for the illustration of forestry teaching, and in this connection they also express the opinion that the forestry department of Coopers Hill should be transferred to a university centre. Forestry should also, they recommend, be a subject of study in the curricula of all agricultural colleges, and the teaching of forestry by county councils is recommended.

The whole tenour of the report is sound, although timidity and want of grasp might be indicated in several places, and it is satisfactory that the President of the Board of Agriculture has now in his hands a statement showing the main lines upon which, in the opinion of those who have given their attention to the subject, the forestry of this country may be improved. It remains to be seen whether any action will follow upon the report.

NOTES.

IT is with deep regret that we announce the death of Sir George Gabriel Stokes, Bart., F.R.S., at Cambridge on Sunday last, at eighty-three years of age. By direction of the president, the ordinary meeting of the Royal Society announced for to-day will, out of respect for his memory, not be held. We believe that representatives of all the scientific organisations with which Sir George Stokes was connected will attend the funeral at Cambridge to-day.

WE regret to see the announcement of the death of the Rev. Norman Macleod Ferrers, F.R.S., master of Gonville and Caius College, Cambridge, in his seventy-fourth year. Dr. Ferrers graduated in 1851 as senior wrangler and Smith's prizeman. He was the author of several mathematical treatises, including one on trilinear coordinates and another on spherical harmonics. He was appointed master of his college in 1880, and was elected a fellow of the Royal Society in 1877.

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It is reported that the Lick Observatory has received from the Carnegie Institution a grant of 800*l*.

THE annual meetings of the Institution of Naval Architects will be held on Wednesday, April 1, and the two following days at the Society of Arts, London, W.C. The Earl of Glasgow, president, will occupy the chair.

MR. HENRY PHIPPS, who is now travelling in India, has given Lord Curzon the sum of 2000*l*. to be devoted to an object of practical benefit or scientific research promising to be of enduring good to India.

THE *Times* correspondent at Rome states that on January 30 the Chamber of Deputies unanimously passed a vote of congratulation and thanks to Mr. Marconi for the great services he had rendered to the world and the glory he had won for his country, Italy.

THE annual meeting of the Society for the Protection of Birds will be held on Tuesday, February 10, at the Westminster Palace Hotel, Victoria Street, London, S.W. The chair will be taken at 3 p.m. by His Grace the Duke of Bedford, K.G.

IT was hoped that Gilbert White's house, "The Wakes," at Selborne, Hants, and the grounds of thirty acres, would be secured by the nation as a memorial to the famous naturalist. Announcement has, however, just been made that the property has been purchased by Mr. Andrew Pears.

THE International Congress of Historical Science will be held in Rome on April 2-9, 1903. Among the eight sections is one of history of the mathematical, physical, natural and medical sciences. Communications should be addressed to the secretary, Via del Collegio Romano, 26, Rome.

THE great electric generating plant at Niagara Falls was destroyed by fire on the night of January 30. The correspondent of the *Standard* says the fire was caused by lightning, which struck a cable with defective insulation. The short circuit thus caused resulted in the explosion of one of the big transformers in the electric power-house operated by the Falls.

ACCORDING to a Reuter message from St. Petersburg, the total number of deaths caused by the earthquake at Andijan on December 16 last was 10,000. Nearly every day subterranean tremblings of varying intensity are still felt at Andijan; on January 19 and 20 there were violent shocks, and at Ugent, some ninety kilometres to the east of Andijan, cracks appeared in the walls of the houses.

DR. HENRY WOODWARD, F.R.S., has been re-elected president of the Royal Microscopical Society. Two visits of members of the Society to the Natural History Museum, South Kensington, have been arranged. The first will be on February 14 at 2 p.m., and the party will be conducted by Dr. H. Woodward; the second visit will take place on March 14, when Mr. W. Carruthers, F.R.S., will act as conductor.

A REUTER message from Bologna announces that Prof. Tizzoni, who recently presented to the Royal Academy of Science a report containing the results obtained from the use of a serum which he has discovered for the cure of pneumonia, states that his discovery is, so far, of purely scientific interest. Prof. Tizzoni has obtained satisfactory results from experiments with the serum on animals. Experiments have been also made with the serum in a hospital at Rome with excellent results.

PROF. SIRODOT, whose death was announced in a recent number, was professor in the Faculty of Science at Rennes for many years. Referring to his contributions to science in an

address before the Paris Academy of Sciences, M. Bornet mentioned the important work which Prof. Sirodot published on the Lemnaceæ, Chantrelia and other genera of the Floridææ. Prof. Sirodot was the first to observe the sexual organs and method of fertilisation in Lemnæa, and also established the fact that some of the fresh-water species of Chantrelia represent merely stages in the life-history of Batrachospermum.

THE Department of Agriculture and Technical Instruction for Ireland has taken steps to place on view for a period of three months, at the Imperial Institute, London, the extensive collection of Irish minerals and building stones which formed one of its exhibits at the recent exhibition in Cork. The exhibit will embrace samples of the varied and excellent building materials and marbles in which Ireland is particularly rich, and it is expected that the opportunity of examining these samples will be of advantage to those who are concerned in the many large building schemes now in progress in London and elsewhere in Great Britain.

THE Berlin correspondent of the *Times* reports that an influential meeting, attended by experts in fire prevention and fire brigade work from all parts of Germany, was held on Monday, February 2, to decide as to the part to be taken by Germany in the impending international fire exhibition in London. It was decided that, under the direction of an influential executive committee, a large hall should be employed exclusively as the German section. Many gentlemen present expressed their intention to attend the International Fire Prevention Congress next July.

ACCORDING to a report by the French Minister at Mexico City published in the *Moniteur Officiel du Commerce* of January 22, the mineral prospectors sent to Mexico by American capitalists have for some time been directing their efforts towards the discovery of coal deposits. The first borings have led to the discovery at El Gallo, in the district of Mazas, of coal, of which the quality is said to be excellent. The French Minister adds that his private information confirms the announcement.

THE decimal division of time has been advocated for some years by writers in several French scientific periodicals. A Geneva correspondent of the *Globe* states that a number of manufacturers in the Neuchâtel canton have already taken to the manufacture of clocks and watches on the decimal system. Chambers of commerce and other trade organisations are also supporting the change. The Cantonal Commercial Chamber at Chaux-le-Fonds has issued a notice calling for models, drawings and designs for appliances and "works" applicable to the decimal adjustment of clocks and watches with the least possible departure from forms now in use.

FATHER LOUIS FROC, director of the observatory at Zi-kai-wei, informs us that since the beginning of this year the noon time-ball at the port of Shanghai has been dropped 5 minutes 56.7 seconds later than previously, so as to bring the time into connection with the international zone system. The meridian adopted is the same as that used for time in the Philippines; it is sixteen hours from the Greenwich meridian and differs from Japan time by exactly an hour. Greenwich time will also be adopted by the Great Northern Telegraph Co. along the coast of China, and it is hoped it will be gradually accepted as the standard in the other open ports.

THE *British Medical Journal* says that during the annual meeting of the American Society of Naturalists recently held at Columbia University, Washington, Prof. William H. Welch, of the Johns Hopkins University, made a preliminary announce-

ment as to an important addition to the list of such endowments. While he was not yet prepared to make the formal public announcement, he stated that within the near future a specially endowed institute or laboratory for research in scientific medicine would be founded in the United States. The institute would, he said, be in a general way similar to the Pasteur Institute of France, and would greatly facilitate and energise special research along lines that would be of incalculable benefit to humanity.

IT is reported that Mr. John D. Rockefeller has announced his intention of spending about £1,450,000 on an institution at which research will be directed towards the discovery of a cure for consumption. The plans contemplate the immediate expenditure of the sum mentioned on a medical department of the University of Chicago, following on the annexation of the Rush Medical College. They involve an elaborate scheme for a great research hospital. Mr. Rockefeller has made it known to the trustees of the University that he wishes to assist the University to evolve men who will take up original research to find cures for stubborn diseases, particularly consumption. One entire division of the new medical department will be devoted to efforts to discover a tuberculosis serum.

REFERRING to the return of Lieuts. Matissen and Koltchak, members of Baron Toll's polar expedition, and nine men of the *Zaria's* crew, the *Westminster Gazette* states that the members of the expedition passed the second winter, 1901-2, in Nerpitchiei Bay, in the island of Kotelnik, New Siberian group, where they lost one of their number, Dr. Walter. The party did not suffer from scurvy, and the great abundance of drift-wood furnished them with material for the construction of dwellings and for fuel, while the reindeer supplied them with fresh meat. Baron Toll, who, accompanied by M. Zebert, the astronomer, left the *Zaria* to explore the interior of Bennett Island, and M. Bialznitsky, the zoologist, who had gone on an expedition to New Siberia, did not return to the ship before her departure, and were left behind. No fears are, however, entertained for their safety.

REUTER'S agency says that the secretary of McGill University College, Montreal, writing to the Press, opposes the establishment of a wireless telegraphy station on Mount Royal in the following terms:—"The physical laboratories are continuously and extensively used for teaching the curriculum of the University, the subjects taught in them being not only an essential part of the University course, but also of fundamental necessity in training men for all branches of engineering and practical science. The operation on Mount Royal of a wireless telegraphy station would seriously impair the usefulness of the physical laboratories and would prevent the University from effectively carrying on in them the work for which they were especially designed and equipped."

AT the annual banquet on January 28 of the Chamber of Commerce of Newport, Mon., Mr. Gerald Balfour, in replying to the toast of "the President of the Board of Trade," made some observations on the recent demands for a Minister and Ministry of Commerce. Referring to the great increase in the staff of the Board of Trade, he said at present the staff amounted to nearly 600, and the first cause of the great augmentation since 1786 was, of course, the immense increase in the wealth and population of the country, and its world-wide activities caused by the introduction of railways, steamships and telegraphs into the apparatus of our civilisation. Another cause was the tendency in these days to throw more duties and responsibilities upon the executive departments of the State. He thought the chambers of commerce were right when they said that, having regard to the importance of the interests of

commerce in this country, these interests should be represented by a Minister and by a department whose rank and *status* corresponded to the importance of the interests with which the Minister and department were entrusted. He was not prepared to admit, however, that a reform of the Department of State entrusted with the interests of commerce should carry with it an entire revolution in the fiscal and industrial policy pursued by this country for the last two generations.

REFERRING to Dr. Charcot's proposed north polar expedition, mentioned in last week's *NATURE* (p. 303), the Paris correspondent of the *Times* says that the expedition, which is under the patronage of the French Academy of Sciences and, indeed, subsidised by that learned body, will include a scientific campaign in Iceland, Spitsbergen and Novaya Zemlya. One of its chief objects is to study the habits and, in general, the biology of the codfish. In the neighbourhood of Spitsbergen, the expedition will spend some time in the investigation of those ocean currents the influence of which is so important a factor in the determination of the climate of northern Europe. At Novaya Zemlya, it is hoped to fix with more precision the limits of the islands which have thus far been insufficiently mapped out upon the marine charts. Two zoologists are to accompany the expedition, as well as a geologist and naval officers, specialists in taking astronomical and meteorological observations. It is also probable that M. de Gerlache, the head of the Belgian Antarctic expedition, will assist Dr. Charcot.

THE changes which are being made this year in the publication of *Science Abstracts* will increase the sphere of usefulness of that admirable periodical. Two separate sections will in future be published, dealing respectively with pure and applied branches of physical science. One section will embrace abstracts of papers on light, including photography; heat; sound; electricity and magnetism; chemical physics and electrochemistry; general physics; meteorology and terrestrial physics; and physical astronomy. The abstracts in the other section will refer to steam plant; gas and oil engines; automobiles; oil engine driven ships and launches; balloons and airships; general electrical engineering, including industrial electrochemistry, electric generators, motors and transformers; electrical distribution, traction and lighting; and telegraphy and telephony. The subscription prices will be eighteen shillings or four and a half dollars for each section separately, including index: for the two sections thirty shillings or seven and a half dollars. The American Physical Society is now joined with the Institution of Electrical Engineers and the Physical Society of London in the direction of the publication, and has elected Prof. E. H. Hall, of the Harvard University, as its representative on the publishing committee. In consequence of this arrangement, the physics section will in future be received by all members of the American Physical Society. The American Institute of Electrical Engineers is also cooperating with the committee and taking special means to bring the publication to the notice of all its members.

NEWSPAPER up-to-date science has of late undergone rapid developments, and now the buyer of a halfpenny paper expects to be regaled, not only with politics and general news, but to have laid before him in very succinct form all scientific results that are expected to have any immediate practical bearing. There is occasionally, we regret to say, an ulterior object in these abstracts, and the expert can often detect the cloven hoof of advertisement for either author or remedy, although this in many cases is ingeniously disguised. The last of this class of jotting dealt with the fact that a dog's life could be maintained for several hours after decapitation by means of the perfusion of a solution of adrenalin or suprarenal extract, and artificial

respiration. The only thing new in this somewhat startling announcement is the substitution of the animal's blood by a solution containing the adrenalin. That life can continue after division of the spinal cord at its junction with the brain, and that the ordinary blood pressure can be maintained by many agents, physical and pharmacodynamic, is, of course, no new fact. Recently the power of duly oxygenated saline solutions to maintain the activity of the mammalian heart for hours has been clearly demonstrated, as indeed has also the vaso-constrictor and hence blood pressure raising power of adrenalin. Whether the alleged life restorer was the adrenalin or the saline is not clear to the public, but to the man of science the latter is more important than the former.

WE have received from Prof. F. H. Bigelow a set of reprints of his articles that have appeared in the *U.S. Monthly Weather Review* from January-July, 1902, on "Studies on the Statics and Kinematics of the Atmosphere in the United States," many of which have been previously referred to in this Journal. These reprints are seven in number, and are on the following subjects:—A new barometric system for the United States, Canada and the West Indies; method of observing and discussing the motions of the atmosphere; the observed circulation of the atmosphere in the high and low areas; review of Ferrel's and Oberbeck's theories of the local and general circulations; relations between the general circulation and the cyclones and anti-cyclones; certain mathematical formulæ useful in meteorological discussions; and, lastly, a contribution to cosmical meteorology.

THE rainfall of Madras has often been investigated as regards its relationship to the sun-spot curve, and the first indication of a probable periodicity with sun-spots was pointed out by Sir Norman Lockyer in 1872 and later by Dr. Hunter, in 1877. Both showed that the rainfall was generally greater at the times of sun-spot maxima than at those of minima. In a recent number of the United States *Monthly Weather Review* (vol. xxx. No. 9, September, 1902), Mr. M. B. Subha Rao, of the Madras Observatory, contributes an article on "The Rainfall in the City of Madras and the Frequency of Sun-spots." The author first investigates the connection between the temperature and rainfall of Madras, but comes to no very definite conclusion on this point. Dealing with the variation of the rainfall and the sun-spot curve from the year 1811, he is led to deduce that the minimum rain "occurs almost exactly on the year of minimum frequency of sun-spots, the difference being only a year in a few cases." He finds, further, that the "maximum rainfall also takes place when we have the maximum frequency of sun-spots," but he guardedly adds that the difference amounts sometimes to two or three years. Anyone who has examined the figures representing the rainfall of Madras will have noticed that there is a general trend towards an eleven-year variation; there is, however, a much shorter and more prominent period of variation, which has recently been shown (Roy. Soc. *Proc.*, vol. lxx. p. 503) to be very closely connected, not only with the variation of atmospheric pressure from year to year, but with the variation of the percentage frequency of prominences seen on the sun's limb. That this is so is strengthened by the fact of the great similarity, on the whole, of curves representing, not only the rainfall of Madras, but those of Malabar, the Western Ghats and Ceylon, and the Indian pressures.

WE have received from Dr. Hergesell a preliminary report upon the international balloon ascents of October 2 and November 6, 1902. The countries which cooperated in these interesting researches were Austria, France, Germany, Italy (for the first time), Russia, Spain, Switzerland and the United States (Blue Hill Observatory). In October, nearly all the

ascents were made in an area of low barometric pressure. The highest altitudes attained by unmanned balloons were:—Strassburg, 13,700 metres, minimum temperature $-51^{\circ}6$ C. (on the ground $5^{\circ}2$); Berlin, temperature at starting 4° , at 13,930 metres $-25^{\circ}0$, but the minimum temperature, $-44^{\circ}2$, was recorded at an altitude of 9214 metres. On November 6, an altitude of 15,612 metres was reached at Chalais-Meudon, minimum temperature recorded $-55^{\circ}2$ (on the ground 11°); Strassburg, 11,300 metres, minimum $-53^{\circ}4$, temperature at starting $-3^{\circ}6$; Berlin, 12,985 metres, $-52^{\circ}6$ (on the ground $1^{\circ}2$). During these ascents, an area of high barometric pressure lay over N.E. and E. Europe, and extended nearly to the western coasts.

THE yearbook of the Meteorological Observatory of Agram for the year 1901 has been received. This is the first volume issued under the new service for Croatia and Slavonia, which is now placed under the superintendence of Dr. Mohorovičić, director of the observatory. Observations for Agram and two other stations were first published in the Austrian yearbook for 1853, and from 1871 by the Hungarian meteorological service. Under the new régime, the number of stations which already existed has been considerably increased, and much advantage will necessarily accrue from the fact that greater uniformity will be introduced by the centralisation of the stations under one authority instead of being dependent on at least three local organisations. The publication of the observations is carried out according to the usual international scheme, but the large-folio shape of the work is somewhat inconvenient for library shelves.

MR. C. E. STROMEYER has exhibited to the Manchester Literary and Philosophical Society samples of boiler scale which show excrescences having a striking resemblance to volcanic cones (Fig. 1). Mr. Stromeier endeavours to show that the formation of these cones is due to unequal heating of the boiler

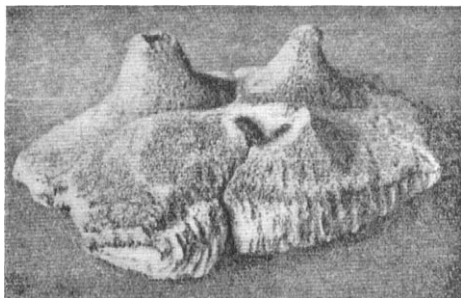


FIG. 1.—Miniature Volcanoes in Boiler Scale.

scale when varying in thickness. He suggests that a similar action may account for the formation of volcanoes and their position near ocean shores. For his arguments upon this subject, we must refer to the *Proceedings* of the Manchester Literary and Philosophical Society for October 21, 1902.

WE have received from Mr. C. T. Whitmell a small brochure entitled "Velocities, Paths and Eclipses in the Solar System," being a paper read before the Leeds Astronomical Society. There is nothing, perhaps, new in the paper, but much that can instruct and interest. We could have wished, however, that the author had been a little clearer in the use of his units. For instance, on p. 2, where a mass of velocities in miles per sidereal hour are given, there is nothing to indicate this, but of course it is readily inferred. The paths of satellites about their respective primaries are very well illustrated, and are especially interesting as showing some of the curves in which our satellite must have moved from the time of its separate existence near

the surface of the earth to its present position, and will assume in its possible subsequent career. In the last section of total eclipses, the author considers the cases in which total solar eclipses can be produced on the various planets of the solar system by the interposition of the various satellites. Here, of course, the data are somewhat doubtful, but we have the advantage of seeing in one table the main conditions of the problem.

AMONG other interesting papers in the last number of the *Journal* of the Quekett Microscopical Club, Mr. Wesché gives an account, with figures, of three male rotifers which have hitherto not been illustrated or described fully. He also describes a new mastax male, which has not yet been identified. The males have only been seen in about 20 per cent. of the known species of rotifers.

MAJOR RONALD ROSS's report on malaria at Ismailia and Suez has been issued by the Liverpool School of Tropical Medicine. No larvæ of anopheles were detected in the freshwater canal and its branches, and Major Ross ascribes this to the presence of fish, which devour them. Numerous larvæ of anopheles were, however, found in the marshes connected with the natural waters round Ismailia. Major Ross considers that it should be an easy matter to abolish malaria in these districts by drainage of swamps and other measures.

COUNTING the red corpuscles of the blood is a tedious and trying process when great accuracy is aimed at. At the meeting of the Physiological Society on January 17, Dr. C. A. MacMunn showed several lantern slides illustrating how this can be done by photographing the blood, diluted to half or to one per cent., in the hæmocytometer of Thoma-Zeiss. Not only are the red corpuscles seen on the plate, but also all the ruling of the cell. The most suitable power of the microscope for this purpose was found to be a $\frac{3}{4}$ -inch objective and Zeiss eyepiece No. 4, with the 6-inch tube-length. About 350 small squares of the instrument are seen on the plate, and if we take, e.g., an average of 7 per square for a dilution of 1 in 200, we have 2450 corpuscles on the plate. A second, a third or more drops can be photographed if necessary, and thus great accuracy can be attained. This method enables one to keep a permanent record of the blood counts, and enables the enumeration to be made at any time that may be convenient. It has numerous applications, obvious to anyone interested in the subject. Of course, the microscope and camera must be used in the vertical position.

REFERRING to the killing of trout by lightning mentioned in last week's issue (p. 304), a correspondent writes to record a similar incident which occurred at Cirencester several years ago. After a vivid flash of lightning, three young gold fish were found dead in their glass bowl near the window of a house. A house not far off was struck by the lightning at the time, and badly damaged.

MR. T. S. HALL, writing from the University of Melbourne, states that from the remarks of Captain G. E. H. Barrett-Hamilton in the British Museum Report on the *Southern Cross* collections, it appears that the Victorian record of the occurrence of the crab-eating seal has escaped notice. The skin and skeleton of one of these seals, a female, caught at Portland, Victoria, in January, 1894, have been on view for some years in the Victorian National Museum. The colour of the skin is a yellowish-white, and the length of the mounted skeleton is about 6 feet 9 inches from snout to tip of tail. A second specimen came ashore at St. Kilda, a suburb of Melbourne, in July, 1897. Its length was 7 feet 4 inches, and it was a pure glossy white. These two occurrences were recorded by Mr. Hall in the *Victorian Naturalist* for August, 1897. Berg's Argentine

record appeared about the same time as the capture of the second specimen. It will be noticed that the first specimen was taken in the height of the Australian summer and the second in the winter.

ATTENTION is directed by Dr. W. Innes, in vol. iv. No. 6 of the *Journal* of the Khedivial Agricultural Society, to the marked diminution which has taken place in the numbers of the more common species of birds met with in the neighbourhood of Cairo. The rock-dove, it is admitted, does an appreciable amount of damage to agricultural products, but the majority of species, and especially the birds of prey, are beneficial. In the last-named group, the diminution in numbers is very noticeable; but quite as serious is the almost total extermination of the cattle-egret, which a few years ago was common on wet lands, or might be seen following the plough in search of mole-cricket and larvæ. "This bird was so common in the past and did so much good that many travellers confounded it with the sacred ibis of ancient times. Although its flesh is poor, this bird has not escaped so-called sportsmen, who kill it simply for the sake of killing." If the birds are not speedily rehabilitated, resort to other and expensive means of destroying deleterious insects will be necessary. The writer urges the authorities to take such steps for bird protection as may seem most suitable without loss of time.

IN the December issue of the *Quarterly Journal of Microscopical Science*, Prof. J. G. Kerr continues his account of the development of the South American lung-fish (*Lepidosiren paradoxa*), treating in this instance of the skin and its derivatives. In a previous communication, the author has referred to the remarkable difference in the appearance of a young *Lepidosiren* by day and by night, the creature at a certain stage of development being of a deep brownish-black by daylight and quite colourless at night. This change of coloration is found to be associated with the withdrawal of the dendritic pseudopodia of the chromatophores. Attention is directed to the fact that the so-called "cement-organ" is developed from the deep layer of the epidermis, instead of, as in amphibians, from the superficial layer. In another communication to the same journal, Prof. W. A. Haswell describes a new species of cestode worm infesting the alimentary canal of the Port Jackson shark. It belongs to the group in which the "proglottides" are set free from the "strobila" long before full maturity has been reached, and only attain a stage corresponding to the "ripe proglottides" of an ordinary *Tænia* after having pursued an independent existence for some considerable time.

FURTHER observations on the habits of *Hypopeltis*, an insect which causes serious damage to the tea bushes, are recorded by Mr. E. E. Green, the entomologist at the Royal Botanic Gardens, Ceylon. There are two periods of inactivity, during January to March, a season of comparative drought, and again from June to August, the season of heavy rainfall. The present paper deals with observations made during the former period. Attempts were made to capture the insects by means of a powerful acetylene light, but failed, partly, perhaps, on account of their relative scarcity; the females when caught were found to contain a large number of eggs, but detailed examination of shoots and leaves showed that very few eggs had been deposited, and such as were found were mostly empty. The writer condemns the system of close plucking, whereby a brush-like formation of small shoots is produced which is particularly suited to the tastes of the *Hypopeltis*; he points out that systematic capture of the insects would be economical, and suggests an arrangement of cutting up the plantation into blocks, each block being screened off by a narrow belt of trees.

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SHORT abstracts of the papers which were read at the International Conference on Plant Breeding and Hybridisation, held in New York last October, appear in the U.S. *Experiment Station Record*, published by the United States Department of Agriculture. The papers by Dr. Bateson and Mr. C. C. Hurst both deal with aspects of Mendel's laws. Allusion was made to the inconstancy of crosses, which often results in reversion, and the explanation was offered that this may be attributed to the crossing of species which are not constant in character. Prof. de Vries took for his subject "Artificial Atavism," defining atavism as the occasional restoration of an old type in a compound cross. The paper by Mr. M. Leichtlin, on some points essential to success in plant breeding, drew forth several remarks on the vitality of pollen, which may maintain its potency for months. Dr. D. Morris gave some account of the experiments which are being made in the West Indies to improve the sugarcane, and mentioned that improvements have in some cases been obtained by making use of bud variations. The inconstancy of plants produced by crossing finds an excellent illustration in the experiments made by Dr. L. H. Bailey with pumpkins.

THE unique features of the flora and fauna of the Galapagos Islands have been well described by Darwin in the account which he gave of his visit during the voyage of the *Beagle*, and Sir W. J. Hooker remarked upon the similarity of the flora to that of the mainland. The most recent information on this subject appears in a memoir written by Mr. B. L. Robinson and published in the *Proceedings* of the American Academy of Arts and Sciences. Mr. Robinson has, with the aid of specialists, not only worked through the rich collection of plants brought back by the Hopkins-Stanford expedition, but has summarised the results of previous accounts and records. The present more extended knowledge still bears out the specialised nature of the Galapageian flora, which is related to that of the adjacent continent and yet distinguished by peculiar varieties, and which is characterised by discontinuity of species and forms even on adjacent islands. The writer discusses the hypotheses which have been advanced regarding the origin of these islands, and, basing his arguments on the limited possibility of seed transference from the mainland to the islands or from one island to the other, and also upon the opportunity for variation owing to specialised conditions, he is led to favour the theory of emergence.

THE attractive "Open-air Studies in Geology," by Prof. Grenville A. J. Cole, published by Messrs. Griffin and Co., Ltd., in 1895, have now reached a second edition. In the new issue, several changes have been made and the book will thus pursue its useful career with renewed vigour. A few new pictures have also been added.

BOTANICAL material of all kinds required for purposes of instruction has been supplied for some time by Messrs. J. Backhouse and Son, Ltd., York, and many teachers and students have availed themselves of this convenient means of obtaining specimens and preparations. The British Botanical Association has been formed to carry on and extend work of this kind, hitherto undertaken by Messrs. Backhouse. The managing director of the Association is Dr. A. H. Burtt, and the address is The Laboratories, Holgate, York.

A COPY of the third German edition of Prof. E. Mach's "Popular-wissenschaftliche Vorlesungen" has been received from the publisher, Herr J. A. Barth, Leipzig. Fortunately for students of science who do not read German easily, Prof. Mach's popular scientific lectures have been translated into English, and the third English edition contains substantially the same articles as those in the present volume. Students of

physics having but a slight knowledge of German could easily follow Prof. Mach's writings, and would gain both pleasure and profit by becoming acquainted with his many suggestive views.

AMONG scientific articles in the magazines for February, the following are noteworthy. In the *Fortnightly Review*, Mr. Maurice Maeterlinck writes of the beauty of field flowers in his usual charming style. Prof. R. A. Gregory contributes to the *Cornhill Magazine* a paper on the astronomy of the unseen, in which he describes the evidence which has been accumulated in recent years as to the existence of dark stars and other non-luminous matter in the stellar universe. The *Royal Magazine* contains an account, by Mr. W. M. Webb, of school gardens in connection with a number of English schools of different grades; the educational value of nature-study in the open air is accentuated in this essay. Mr. F. W. Stokes contributes to the *Century Magazine* an article on the Aurora Borealis, which is illustrated with four coloured plates reproduced from the author's own paintings.

THE additions to the Zoological Society's Gardens during the past week include a Fennec Fox (*Canis cerdo*) from North Africa, presented by Dixon Bey; a Mandrill (*Cynocephalus mormon*) from West Africa, presented by Mr. M. Vickers; a Buffon's Touracou (*Turacus buffoni*) from West Africa, presented by Mr. V. G. Gane; an Elate Hornbill (*Ceratogymna elata*) from West Africa, presented by Mr. Francis Hart; a Water Rail (*Rallus aquaticus*) British, presented by Lieut.-Colonel L. H. Irby; a Kinkajou (*Cercoleptes caudivolvulus*) from South America, a Great Wallaroo (*Macropus robustus*) from South Australia, deposited.

OUR ASTRONOMICAL COLUMN.

COMET 1903 α (GIACOBINI).—The following observations of this comet are reported in No. 3841 of the *Astronomische Nachrichten*:—

January 20, 6h. 54m. 12s., Göttingen, $\alpha = 22^{\text{h}} 58^{\text{m}} 48^{\text{s}}$, $\delta = +2^{\circ} 30' 4''$. No nucleus.

January 21, 6h. 22m. 0s., Strasburg, R.A. = 22h. 59m. 51s., Dec. = $+2^{\circ} 44' 8''$.

January 21, 7h. 9m. 30s., Heidelberg, R.A.(app.) = 22h. 59m. 52s. 4, Dec. = $+2^{\circ} 44' 38''$, mag. = 10.0.

January 22, 6h. 29m. 30s., Heidelberg, R.A.(app.) = 23h. 0m. 54s. 6, Dec. = $+2^{\circ} 58' 37''$.

RETURN OF PERRINE'S COMET, 1896 vii.—Herr Ristenpart has calculated the corrected elements and the ephemeris, given below, for the return of this comet during the present year.

T = April 26.6, 1903.

$$\left. \begin{aligned} L &= 35^{\circ} 50' 84'' \\ \pi &= 49^{\circ} 4' 02'' \\ \Omega &= 242^{\circ} 20' 40'' \\ i &= 15^{\circ} 41' 28'' \end{aligned} \right\} 1903$$

$\log q = 0.54313$

Ephemeris 12h. M.T. Berlin.

Date	α 1903.0 h. m.	δ 1903.0 ° ' "	$\log r$	$\log \Delta$	Bright- ness.
Feb. 6.5	22 5.9	- 1 27	0.1840	0.3856	0.22
" 14.5	22 28.0	+ 0 21	0.1670	0.3780	0.25
" 22.5	22 52.5	+ 2 17	0.1501	0.3703	0.28
March 2.5	23 17.4	+ 4 20	0.1337	0.3627	0.31
April 3.5	1 9.0	+ 12 47	0.0806	0.3385	0.44
May 5.5	3 12.7	+ 18 49	0.0690	0.3354	0.47

Unit brightness at time of discovery (*Astronomische Nachrichten*, No. 3841).

PHYSICAL CONSTITUTION OF JUPITER.—As chairman of the Mathematics and Astronomy Section of the American Association for the Advancement of Science, Prof. G. W. Hough read a paper on the above subject at the Washington meeting held on December 29.

After reviewing the history of the observations of Jovian phenomena, Prof. Hough gave a detailed account of his own

observations, which date from 1879. All the measures made by him were micrometrical, and he strongly deprecates the making of mere visual observations wherever it is possible to use a micrometer. Details are given of his measurements of the change of latitude and the rotation period of the Great Red Spot, and the variations are illustrated by four curves which accompany the paper. From the fact that some spots have shorter periods than others, Prof. Hough deduces that the spots must exist at various heights in the planet's atmosphere.

Some observations of transits and eclipses of the satellites led to the deduction that the satellites have no inherent light of their own and that the planet is not hot enough to produce light.

Prof. Hough also draws some very interesting conclusions as to the density and general physical constitution of the planet, and the nature of the various markings seen projected on its surface, and these conclusions argue strongly against the theory that the markings—excepting the belts—are of the nature of clouds in the planet's atmosphere.

The complete address is published in *Science* for January 16.

OBSERVATIONS OF VARIABLE STARS.—Mr. A. Stanley Williams communicates his observations of thirteen recently discovered variables to No. 529 of the *Astronomical Journal*.

DEFINITION OF JUPITER'S MARKINGS. ACCELERATION IN THE MOTION OF THE GREAT RED SPOT.

THE study of Jovian markings has been rendered very difficult for European observers in recent years owing to the position of the planet far south of the equator. Telescopic definition has been rarely good, and the more delicate and diminutive of the surface features have usually been obliterated amid the turmoil of seething vapours in which the image has been involved. The effect of unsteady, confused definition is to smooth off objective irregularities and to produce momentary displacements and contortions, giving rise to false appearances which are sometimes considered real by imaginative or inexperienced observers. When the disc is affected by rushing vapours, the belts often appear as the only distinguishing marks on the planet, and they look even and spotless, so that the observer may readily conclude that Jovian phenomena are temporarily quiescent. But when the disc is outlined with livid sharpness and the details stand out boldly, as they often do in the comparative absence of atmospheric ebullition, the aspect of the planet seems to have been transformed, and a crowd of interesting features immediately present themselves for examination. On special occasions of this kind, it is possible to take between fifty and a hundred transit-times of well-defined marks in the course of a few hours.

On July 11 and 13, 1902, Jupiter appeared in my 10-inch reflecting telescope under a power of 312, magnificently defined. The whole face of the planet seemed figured over with rugged detail. I saw many features on those nights which were not seen again, though repeatedly looked for with the utmost care. The belt scenery was very diversified, and it struck me as being totally dissimilar to the smooth indefiniteness commonly displayed under less suitable conditions. During the progress of my observations at Bristol in recent years, I have usually recorded the state of the seeing, and the following is a summary of the records for the last five oppositions of Jupiter:—

Observations of Jupiter, 1898–1902.

Opposition.	South declina- tion of Jupiter.	Nights of observation.	Nights when seeing record	Definition.					Transit-times taken.
				Very good.	Good.	Fair.	Bad.	Very bad.	
1898	1	51	41	5	8	11	11	6	280
1899	12	76	69	7	13	20	19	10	668
1900	20	36	30	2	7	9	8	4	307
1901	23	76	71	5	10	11	24	21	547
1902	18	89	81	6	14	15	31	15	1005
5 years	—	328	292	25	52	66	93	56	2807